

**GGY/GLY 335: GEOMORPHOLOGY  
FINAL EXAM, SPRING SEMESTER 2008  
ESSAY QUESTIONS**

**DUE DATE:** essays are due during our scheduled final exam period, by 2:30 pm on Thurs., May 1. You can bring the essays to me in my office (DL 220), or to the department office (DL 102), or email them as an attachment in MS Word. Don't miss this deadline! Late essays cannot be accepted.

**INSTRUCTIONS:** Choose and answer 5 questions from the list below. Each answer should be roughly 2-3 paragraphs, or about one page of double-spaced 12-point type. Essays will be graded on the completeness, clarity, and quality of your answers. The purpose of the essay exam is to demonstrate that you comprehend the topics covered. Your answers should go beyond simple statement of the facts, and should explain your understanding of the topic in your own words. You are encouraged to use examples that we have covered in class, or in the textbook, or from other sources to illustrate your answers.

- 1. Aeolian source regions.** Describe the environmental conditions necessary for a place to become a source of aeolian sediment, a place where wind erosion occurs. Give an example of a place where those conditions either exist today, or used to exist in the past. Where does the sediment eroded from that source region end up, and what effect does it have on the environment where it is deposited?
- 2. Glacial erosion.** Glaciers are among the most effective agents of erosion at the surface of the earth. Yet, it is obvious that glaciers cannot directly cause erosion of bedrock because ice is much softer than rock. So how does glacial erosion occur? In what kind of environments do you think most glacier erosion occurs? Briefly describe two of the processes that allow glaciers to erode weathered earth material, and describe two of the landforms that may be created by glacier erosion.
- 3. "Warnings From The Ice."** Why is the West Antarctic ice sheet (WAIS) considered extremely important by earth scientists? Why is it so different from the East Antarctic ice sheet? Why is the movement of the WAIS so hard to predict? Briefly describe one of research methods being used to understand changes in the ice sheet.
- 4. Eustasy.** What is eustasy, and how does it differ from relative sea level change? Name and describe three specific types of eustasy. Do these involve changes in the volume of water in the ocean, or changes in the size and shape of the ocean basin? Which types of eustasy are going to have the greatest impact on sea level in eastern North Carolina over the next 100 years?
- 5. Barrier islands.** When and how did the barrier islands on the North Carolina coast form? How do the barrier islands continue to exist despite rising sea levels and strong coastal storms? If sea level rise continues at the current pace, what do you think the barrier islands will look like in the year 2100?
- 6. Sand.** Sand is one of the most common types of sediment found at the surface of the earth. Large bodies of sand are deposited along coastlines, in dune fields, and in river valleys. What are the properties of sand that make it so abundant in these settings? Give an example of a specific place with a large sand deposit. Why is well-sorted sand found in this setting? (Why is it a sand deposit, and not mixed together with other particle sizes such as silt and clay and gravel and boulders?)
- 7. Shear stress.** What is shear stress? Briefly describe the role of shear stress in eroding/transporting sediments in fluvial, aeolian, and glacial settings. In each case, what natural factors could cause an increase in the shear stress, and what would be the result?
- 8. Form, process, material.** (*Note: extra bonus points will be added for answering this challenging question!*) One of the themes of this class has been the inter-relationships between land forms, geomorphic processes, and earth materials. In most cases we study the geomorphic process to explain the material and form. The process mechanics determine what types of material can be transported, and how the landform is shaped by erosion or deposition. In other cases, we use the form or material as evidence to reconstruct the process that created it in the past. Discuss two examples that illustrate these relationships. The examples may come from any type of geomorphic system, anywhere in the world, as long as they include description of forms, processes, and materials.